

## From Theory to Collaboration: A Literature Review on Disposal Behaviour and Its Scholarly Interconnections

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### ABSTRACT

Despite the lack of emphasis on consumer disposal behavior in marketing, there has been a lack of systematic efforts to compile information on this topic, which poses a barrier to future research. Product disposal has environmental, social, and corporate consequences and therefore conscious disposal and consumption is the need of the hour. All life on Earth is harmed by indiscriminate garbage disposal, which also contributes to global warming, environmental degradation, cholera, malaria, flooding, and contamination of soil and water. Waste management is addressed in Sustainable Development Goals 11 and 12 of the United Nations (2021). In recent years, this field of study has expanded swiftly due to its contribution to the reduction of rising pollution levels. The behavior associated with disposal is complex and interdisciplinary. Present study employs bibliometric and network analysis in conjunction with an exhaustive review of the literature to ascertain significant patterns and potential avenues for future investigation. The research incorporated 88 Web of Science articles published in the last thirty years. This study provides an exhaustive literature review, the development of macro themes, and recommendations for future research. The disposal behavior variables diagram illustrates the manner in which internal and external factors impact the behavior's causes and consequences. In addition, the results obtained revealed that collaboration among researchers in the field of disposal behavior has grown in recent years.....

**Keywords::** Product disposal, disposal behaviors, literature review, nomological network, and Collaboration index .

### INTRODUCTION:

Few decades ago a new field of study, disposal of products in consumer behavior was averred by Jacoby, Berning, & Dietvorst, (1977). Since then, the interest in the field has grown. It is the final stage of a consumption process when the customer looks for ways to dispose off the used products like throwing, donating, hoarding etc. (Jacoby, Berning and Dietvorst, 1977; Cruz-Cárdenas and Arévalo-Chávez, 2018). On a daily basis, customers recognize requirements, contemplate wants, hunt for information on things of interest, learn about utilizing the products, and experience them. Consumers focus on buying and using items, but they rarely consider how to dispose of them when they're done using them according to their requirements. Disposal is a new path for product owners since the product may no longer serve the purpose, be obsolete, have fulfilled the purpose it was acquired for, or have failed to serve the purpose. (Radtko et. al., 2022).

Product disposal affects customers, businesses, society, and the environment (Cruz-Cárdenas and Arévalo-Chávez, 2018). It benefits both businesses and consumers by improving closet and household organization, leading to stress relief (Lang, Armstrong and Brannon, 2013; Cruz-Cárdenas and del Val Núñez, 2016).

According to Saxbe and Repetti (2010), persons with untidy houses and incomplete undertakings are more stressed and depressed. Donating items keeps them in the economy or sends them to landfills and waste dumps (Bianchi and Birtwistle, 2010), which is an utmost important factor from the societal and environmental viewpoint. Many macro marketing advocates vouch for sustainable consumption as an important approach towards sustainable development without proper consensus on how this can be achieved (Bianchi and Birtwistle, 2012).

Expeditious growth in per capita income, urbanization and population has led to increase in the resource consumption followed by colossal amount of waste. Abysmal waste

management leads to the clogging of drains which causes floods and an increase in the population of disease-causing vectors. When the waste is burned, it causes respiratory problems through hazardous air-borne particles. Animals consume harmful particles unknowingly, waste materials flowing into water bodies contaminate them, and unmanaged or improperly managed waste also diminishes tourism by degrading destinations' aesthetic value.

In the past decade, waste generation has massively gone up, and there is no slowing down in the coming years. According to Statista (2022)<sup>1</sup> municipal solid waste is going to increase by 70 percent till 2050 which is about 3.4 billion tonnes every year worldwide. In the 21st century, growing waste has become a major concern for governments, corporations, academic institutions, and non-governmental groups. Countries' policies and practices are changing as families, institutions, and companies create more garbage. The new policies being formed worldwide are aiming towards zero waste in order to address decarbonization and climate crisis. At 26th Conference of Parties to the United Nations Framework Convention on Climate Change (COP26) held in Glasgow, 2021 several countries pledged to reduce pollution and waste by fast-tracking the adoption of zero-waste techniques with a target of keeping global warming this century under 2 degrees celsius.<sup>2</sup> Governments are prioritizing economic growth and environmental protection and creating new legislation and policies to promote sustainable development. Businesses, along with the government, play a very important role in attaining sustainable development by producing environmental friendly products (Pearce, Barbier and Markandya, 2013; Lee, Choi and Koo, 2017). As the climate changes, countries worldwide are reducing their carbon footprints. Climate activists worldwide are protesting to raise awareness. The amount of consumer environmental behavior publications shows that academics and researchers support the environment. More researchers are studying pro-environment behavior. (Esmacilian et al., 2018; Simpson et al., 2019; Sandes et al., 2019; Wang et al., 2020; Goworek et al., 2020; Xiaolong et al., 2021; Sarigöllü, Hou and Ertz, 2021).

In the present study authors have used extensive literature review & bibliometric analysis in order to (a) analyse publication and citation trends of disposal behaviour research, (b) identify influential articles and journals on disposal behaviour research and (c) identify notable and prominent disposal behavior researchers who have contributed to academic foundation and intellectual progress in the respective field. (eg Kumar, V. et al.(2007), Šimat, V. et al. (2020), Cruz-Cardenas Jorge (2019), Fortuna (2017 a, b), Khor (2013; 2016), Khor, K. et al.(2013, 2015) etc).

Section 2 of the paper discusses the significance of this research to disposal behavior. The findings from these studies offer a robust demonstration of the evolution and structure of disposal behavior literature. Furthermore, thematic content analysis was adopted to identify various

intellectual perspectives underlying disposition to uncover salient research themes. The authors have constructed a conceptual model and nomological network based on 30 years of study on disposal behavior. This analysis provides a thorough overview of the development of this field by identifying the research boundaries associated with generalizations. This in-depth understanding will guide managers to take interest in the adoption of disposal strategies of products they are offering and reduce the wastage of resources for pursuing sustainable and wealthy practices. In doing so, this study sheds light on trends in disposition behavior research and outlines a future research agenda.

### **Objectives of the Study: -**

The main objective of the study is to showcase the state of research on disposal behaviour and future scope of research in this domain with the help of the following five research questions.

RQ1. What are the publication and citation trends of disposal behaviour research?

RQ2. Which are the most influential articles and journals on disposal behaviour research?

RQ3. What are the authorship patterns and degree of collaborations in disposal behaviour research?

RQ4. What are the major themes in the intellectual structure of disposal behaviour?

RQ5. Where else can prospective scholars contribute to disposal behaviour?

The flow of this paper is designed as follows: section 2, briefly addresses research scope and method selection for literature reviews, followed by the methodology taken for the study. At the end, this study sheds light on the results of bibliometric analysis and thorough discussion on the prevailing themes in the field. This study then finishes up with the implications, limitations and directions for future research.

### **2. The research scope and method selection for literature reviews: -**

Waste management is a systematic process that starts from waste inception to its final disposal. The impact of social values has changed on the product redistribution behaviours of end-user, and it can be reselling, passing alone, and donating (Hou and Sarigöllü, 2021). In the earlier time, disposal concepts were more converged with industrial and chemical wastage ( Thomson, Poms and Rose, 2012; Taylor and Liu, 2013), latter it relates with different types of products such as: garments (Norum, 2017; McNeill *et al.*, 2020, Hassan, Yeap, and Al-Kumaim, 2022), biomedical waste ( Choi et al., 2022), agricultural waste ( Dunnigan *et al.*, 2018), electronic waste or E-waste (Borthakur and Govind, 2019; Gilal *et al.*, 2019, Siddiqua et al., 2022), animal bi-product (Conesa, Fullana and Font, 2005; Peters *et al.*, 2017), etc. Functional values, psychological needs, word of mouths,

<sup>1</sup> [https://www.statista.com/topics/4983/waste-generation-worldwide/#topicHeader\\_wrapper](https://www.statista.com/topics/4983/waste-generation-worldwide/#topicHeader_wrapper)

<sup>2</sup> <https://www.unep.org/news-and-stories/story/what-you-need-know-about-cop26-un-climate-change-conference>

and emotional attachments with products have impact on product disposal behaviour (Simpson et al., 2019; McNeill et al., 2020 and, Yu and Lee, 2019, Gilal et al., 2019)

Fortuna and Diyamandoglu, (2017) and Norum, (2017) have focused more on choices and trends of disposal and acquisitions of second-hand products. Researchers like Wang *et al.* (2017) use the stochastics and bass models to identify the product diffusion process. The existing literature on consumer disposal behaviour is quite scattered. Moreover, a thorough bibliometric analysis and a structured review of consumer disposal behaviour can investigate the current research scope and key clusters in this research area. Compared to the traditional literature review, visualizations of network analysis by bibliometric tools and systematic literature review enhances the opportunity to find the future research gap of a research field. So, the study concentrates on different perspectives of product disposal behaviour and their antecedents and

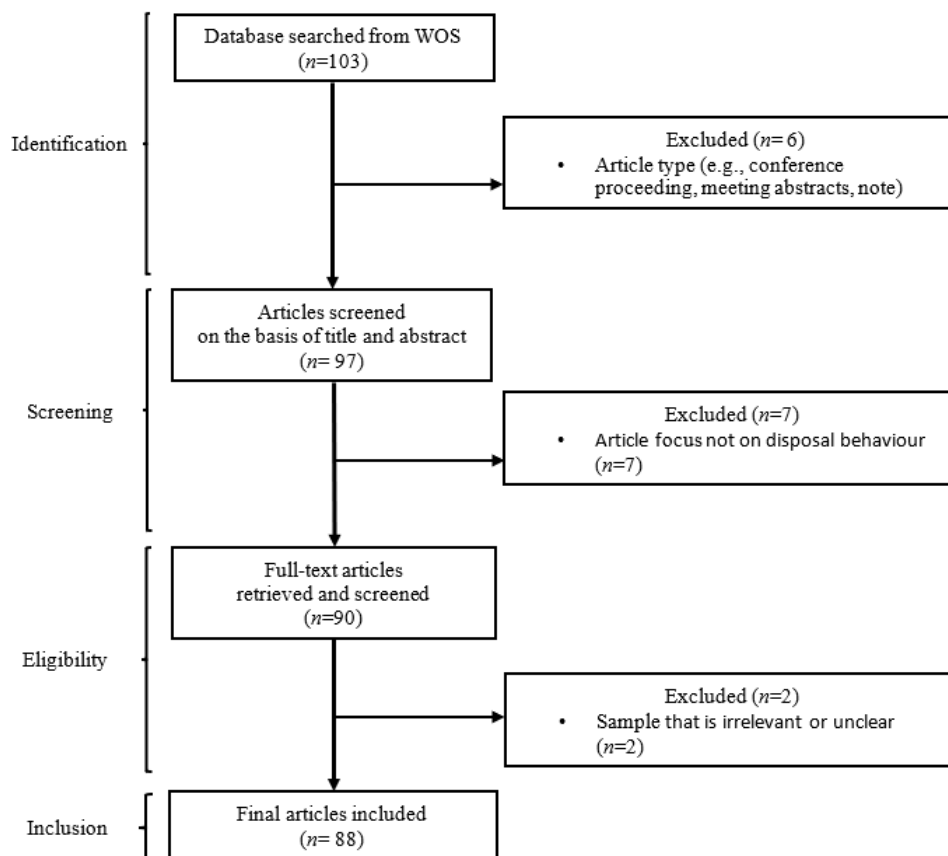
consequences with the help of a systematic literature review and bibliometric analysis of past studies.

### 3. Research methodology and initial statistics: -

#### 3.1 Data Collection

Designing literature reviews, conducting bibliometrics, and making results are well structured, systematic, and iterative processes. The iterative process starts by searching keywords and then is required to identify and analyse relevant literature. A well-structured bibliometric analysis needs to follow sequential steps (Fahimnia, Sarkis and Davarzani, 2015). Those steps are broadly categorized into five: database selection and searching technique, identification of primary data corpus, screening to select final data corpus, initial descriptive analysis and bibliometric analysis. Figure 1 of the study depicts the first three steps, while steps four and five are described in section 5 and section 6.

Figure 1. Article selection process



The manuscript compiled a list of publications that discussed ‘disposition’ and ‘disposal behaviour’. This research focuses on different panoramas of disposal behaviour and tries to find any theoretical underpinning besides literature. This limits the study within the top-tier journals and excludes technical related journals in the data corpus. Web of Science (WOS) is used as the database to extract data corpus for this study. Reasons for selecting WOS are: helps to search keywords from social science citation indexing (SSCI) journal (Norris and Oppenheim, 2007; García-Lillo *et al.*, 2020), and it is the world’s most comprehensive database of published articles. All the top-

tier journals are enlisted in this database. The WOS is the most suited database for bibliometric analysis (Norris and Oppenheim, 2007; Gaviria-Marin, Merigó and Baier-Fuentes, 2019; Kruggel, Tiberius and Fabro, 2020). The study considers only peer reviewed journals and excludes conference proceedings, meeting abstracts, etc. to maintain the high-quality publications in data corpus (Meier, 2011; Liu *et al.*, 2015).

#### 3.2 Initial search and Refinements of the results

The searched string used in the ‘topic’ of the WOS database were “product disposal” OR “product disposition” OR “disposal behaviours”. The data was extracted on 22<sup>nd</sup> July 2022. The initial data corpus had 103 items, and the language “English” was considered one of the filters to extract data. The article selection process in the study consisted of four subprocesses (Figure 1): identifications, screening, eligibility, and inclusion. In the identification stage, six articles were excluded as they were conference proceedings, meeting abstracts and notes. After going through the abstracts of all ninety-seven papers, seven papers were discarded because those seven articles were not completely on disposal behaviour. In the third step, after screening the ninety full articles, the other two articles were found to be irrelevant or not fitting with the context of the research topic. The final data corpus came in eighty eight research articles; this is known as inclusion.

### 3.3 Analysis method:

The study follows a combination of systematic literature review and bibliometric analysis. The combination is effective and well established to perform systematic

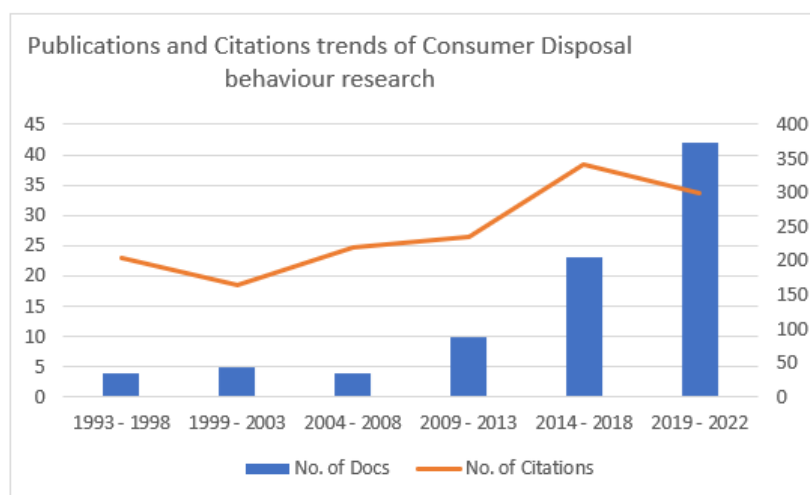
review (Caputo *et al.*, 2018). The most common bibliometric methods have been performed in this study, such as publication and citation trends, most influential articles, and the most prominent contributors in this domain as publishing houses (Paul and Benito, 2018; Paul and Rosado-Serrano, 2019). Additionally, co-occurrence of keywords analysis, cluster analysis and thematic analysis executed to understand the intellectual structure of this domain. Software used in this study are Excel, Bibexcel, and Vos Viewer (van Eck and Waltman, 2010). Vos Viewer helps to make network mapping among similar items as clustering of keywords. Thematic analyses have been done to understand themes behind every cluster and identify gaps for prospective researchers.

## 4. Descriptive results:

### 4.1 Trend of publications in time:

The section discusses the publications and citations trend of disposal behaviour research of the last thirty years in the six-time brackets (Figure 2).

**Figure 2: Publications and Citations trends of disposal behaviour research**



Between 1993-98, four papers published on disposal behaviour, and the most cited one is on hygienic environmental conditions (Curtis *et al.*, 1993). Another is on the impact of disposal techniques on inventory control (Van Der Laan, Dekker and Salomon, 1996).

In the next time frame, between 1999-2003, one of the most insight comprehensive research projects is on the challenges of safety stock planning in product disposal (Minner, 2001). A considerable leap in the total number of citations of research articles between 2004 to 2008 indicates the popularity and importance of disposal behaviour research within academics.

The popularity of sustainable disposal behaviour (SDB) gained momentum between 2009 to 2013 as many researchers focused on reverse logistics, green product design, and carbon flux-related production (Khor and Udin, 2013;). In the subsequent two consecutive time frames from 2014 to 2022, SDB (Khor *et al.*, 2016; and Šimat *et al.*, (2019)), perception & behaviours of second-

hand products (Liang and Xu, 2018) were the primary areas among the disposal behaviour researchers.

### 4.2 Publication outlet:

Table 1 depicts the top journals ordered by the number of citations and publications. International Journal of Production Economics (IJPE) and Journal of Cleaner Production are the two most prominent journals in terms of citations. Sustainability and Journal of cleaner production are the two most productive journals in terms of number of articles published so far. Furthermore, the next set of notable journals are Bulletin of the WHO; Chemosphere; Resources Conservation & Recycling; Waste Management; and Sustainability. A good amount of recent and relevant publications of the above journals suggested different avenues behind the sustainable disposal behaviour of consumers as coordination between supply chain members and customers (Norum, 2017). word of mouth (Gilal *et al.*, 2019), nostalgia affect (Wang *et al.*, 2020), etc.

**Table 1: List of journals where the 82 research papers analyzed have been published**

Journal	Citation	Journal Impact factor	Frequency	Percentage	Total percentage
SUSTAINABILITY	41	3.251	6	6.82	6.82
JOURNAL OF CLEANER PRODUCTION	159	9.297	5	5.69	12.51
INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	221	7.885	4	4.55	17.06
WASTE MANAGEMENT	49	7.145	4	4.55	21.61
RESOURCES CONSERVATION AND RECYCLING	68	10.204	3	3.4	25.01
INTERNATIONAL JOURNAL OF CONSUMER STUDIES	29	3.864	3	3.4	28.41
JOURNAL OF CONSUMER BEHAVIOUR	27	3.280	3	3.4	31.81
Others (52 Journals)	-	-	60	68.19	100
Total			88	100.00	

**Table 2: List with the top ten of the most-cited research as on 22<sup>nd</sup> July 2022**

Author Full Names	Article Title	Source Title	Times Cited, All Databases	Publication Year	Citations/year
Curtis, V; Cousens, S; Mertens, T; Traore, E; Kanki, B; Diallo, I	Structured observations of hygiene behaviors in Burkina-Faso - validity, variability, and utility	Bulletin of the world health organization	130	1993	4.48
Minner, S	Strategic safety stocks in reverse logistics supply chains	International journal of production economics	83	2001	3.95
Donnelly, Kathleen; Beckett-Furnell, Zoe; Traeger, Siegfried; Okrasinski, Thomas; Holman, Susan	Eco-design implemented through a product-based environmental management system	Journal of cleaner production	76	2006	4.75
vanderLaan, E; Dekker, R; Salomon, M	Product remanufacturing and disposal: A numerical comparison of alternative control strategies	International journal of production economics	74	1996	2.85
Conesa, JA; Fullana, A; Font, R	Dioxin production during the thermal treatment of meat and bone meal residues	Chemosphere	56	2005	3.29
Khor, Kuan Siew; Udin, Zulkifli Mohamed	Reverse logistics in Malaysia: Investigating the effect of green product design and resource commitment	Resources conservation and recycling	49	2013	5.44
White, MK; Gower, ST; Ahl, DE	Life cycle inventories of roundwood production in northern Wisconsin: Inputs into an industrial forest carbon budget	Forest ecology and management	49	2005	2.88
Chappell, Mark A.; Miller, Lesley F.; George, Aaron J.; Pettway, Brad A.; Price, Cynthia L.; Porter, Beth E.; Bednar, Anthony J.; Seiter, Jennifer M.; Kennedy, Alan J.; Steevens, Jeffery A.	Simultaneous dispersion-dissolution behavior of concentrated silver nanoparticle suspensions in the presence of model organic solutes	Chemosphere	48	2011	4.36

Khor, Kuan Siew; Udin, Zulkifli Mohamed; Ramayah, Thurasamy; Hazen, Benjamin T.	Reverse logistics in Malaysia: The Contingent role of institutional pressure	International journal of production economics	44	2016	7.33
McDonnell, K; Desmond, J; Leahy, JJ; Howard-Hildige, R; Ward, S	Behaviour of meat and bonemeal/peat pellets in a bench scale fluidised bed combustor	Energy	44	2001	2.10

### 4.3 Authorship patterns and Degree of Collaborations

The authorship pattern indicates collaboration of that domain, and the value of the degree of collaboration justify different types of collaborations as supervisor-subordinate, researchers-organizations, colleagues, inter-organizational and intra-organizational (Subramanyam, 1983). The study is not so detailed to identify collaboration patterns and levels. The authors of the study determined that the degree of collaboration has sharply increased from 0.58 to 0.95 (Table 3). Interestingly, decuple (Y. Zhang *et al.*, 2019), undecuple (Tang *et al.*,

2020), and tredecuple (Schmidt *et al.*, 2022) papers came into the disposal behaviour research within the last five years. Less than ten percent of the data corpus in this study are single-author papers. This study's authorship pattern is quite contradictory to the study of Garfield (1979). According to Garfield, 17-25 percent of papers are only accounted for as multi-author papers in economics, sociology, and social work. One of the reasons for the contradictions is the scope of making an invisible college (Gmür, 2003; Sedita, Caloffi and Lazzaretto, 2020; Sharma, Saha and Balaji, 2022) is relatively easy compared to ten or fifteen years back.

**Table 3: Authorship patterns and Degree of Collaborations in Disposal Behaviour**

Period	1993- 2000	2001- 2007	2008 - 2014	2015 - 2022	1993 -2021
Degree of Collaboration (*)	0.58	0.83	0.91	0.95	0.91
Articles	7	6	11	64	88
Single	3	1	1	3	8
Double	1		3	12	16
Triple	2	2	4	14	22
Quadruple		1	1	15	17
Quintuple		2		8	10
Sextuple	1			6	7
Septuple			1	3	4
Octuple					0
Nonuple					0
Decuple			1	1	2
Undecuple				1	1
Duodecuple					0
Tredecuple				1	1

## 5. Intellectual structure:

### 5.1 Themes emerging from co-authorship

In order to explore co-authorship networking in Customer Disposition Behavior, authors identified the most significant authors and examined researchers' collaborations (Table 3). Co-authorship is a formal method of intellectual collaboration among scholars, and its study allows researchers to understand relationships among them. As knowledge builds over knowledge, theoretical and methodological complexity has expanded and become more automated and data-driven, leading academics from one discipline to seek scholars from

another field with data analysis abilities for collaboration (Acedo *et al.*, 2006; Donthu *et al.*, 2021).

The section of the study tried to identify the most influential authors within the network collaborations and the extent of collaborations among them. The major five themes that have been identified are as Product Redistribution, By-product disposal strategies, Acquisition and disposal methods of used products, Factors influencing product reuse strategies, and Reverse logistics.

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**Table A1: Prominent authors of different subdomains of disposal behaviour**

Cluster name & Cluster number	Prominent Authors	Focus	Key research areas	Future research areas
Product Redistribution (Cluster - 1)	Sarigollu, Emine	Focused on the product redistribution behavior of consumers. Understanding disposal behaviorbehaviour is also important from the businesses point of view as it provides them with strategic opportunities for new product development and product innovations with the focus on circular designing capabilities which are being pushed by the several national governments (Paden and Stell, 2005). Majority of the studies pertaining in the redistribution behavior field have taken consumers' intention to act in a certain way into consideration but people's actual behavior and their intention to behave in a certain manner may be wary.	Prominent Redistribution Behaviours: reselling, passing along/ donating, hoarding/ throwing away Consumption values (social value, emotional value, functional value) Product lifetime extension Waste management- waste minimization and waste aversion	Antecedents and consequences of Product redistribution Relationship between personality traits and product redistribution pattern Consideration of actual product redistribution behavior instead intention to product redistribution Effect of different product categories on redistribution behavior of same set of respondents Cross-country investigation on product redistribution in order to gauge the role of different cultures.
By-product disposal strategies (Cluster - 2)	Simat Vidahovic, Jelena Soldo, Barbara Mekinic, Ivana Generalic, Skroza, Danijela	Focused on the reusing practices related to product acquisition and disposal. Earlier local reuse was preferred by the consumers due to its ease of distribution but lately online platforms for donating and selling second hand products have caught up the consumers attention (Fortuna and Diyamandoglu, 2017a). Preferred disposal method is generally dependent on one's perception of reuse value of the product and amount of effort required to dispose them off. Lack of knowledge about different avenues available for disposing off the products contributes to disposal of reusable products as waste. The cluster focus only two product categories (apparel and furniture), further investigation into the prominent disposal patterns for categories like paper and	Characterization and production of crude oils obtained as by-product from farmed fish Comparing and reporting the characteristics of by products obtained from filleting of farmed fishes. Investigation into the potential of waste recycling obtained in the fisheries industry into higher valued products. By-product oils extracted from farmed tuna, wild sardine and seabream were found to be of good quality with observed parameters within the standard set values.	Other methods of conversion of fish waste into products of higher value can be explored. Research into other oil refining methods could provide us with improved products with better stability and characteristics.

		paperboard, green waste and plastics (which constitute the majority of landfill waste) can be conducted. Factors responsible for promoting reuse of the products among consumers can also be explored.		
Acquisition and disposal methods of used products (Cluster - 3)	Diyamandoglu, Vasil, Fortuna Lorena M	While disposing of the clothes consumers may resort to many actions like: giving them away, donating, selling, reusing, storing, lending or throwing them away depending on their convenience and mindset (Jacoby, Berning and Dietvorst, 1977). This cluster investigated solid waste management techniques and identified different routes leading to product diversion in different waste management streams. Future studies can focus on quantification of demand of second-hand products for reusing purposes that affects the reuse sector capacity.	Solid waste management Acquisition practices and disposal habits of second-hand products Identification of low impact routes in order to improve the product diversion in solid waste management streams. Identification of main reuse venues and their corresponding material flows. Environmental benefits of reuse.	Researchers can investigate the prominent disposal patterns for categories like paper and paperboard, green waste and plastics which constitute the majority of landfill waste. Rental behavior patterns can also be studied in future research studies. Study on factors that promote reuse intention among consumers. Studies on quantification of demand of second hand products for reusing purposes that affects the reuse sector capacity.
Factors influencing product reuse strategies (Cluster - 4)	Cruz-Cardenas Jorge	Comprises various behavioural and demographic factors on product reuse strategies. In the process of reusing where customers may reorient the used clothes using their resources and performing a series of actions in order to create a value for themselves (Cruz-Cárdenas, Guadalupe-Lanas and Velín-Fárez, 2019). According to the customer-dominant logic, consumers are the central figure in the process of value creation (Grönroos and	Impact of demographic, psychographic and physical variables on acquisition and disposal behavior of the consumers. Relationship between new purchases and disposal practices. Factors pertaining to consumers' lives that explain their behaviour in creating value through reuse.	Quantifying the expenditure on clothes and shoes variable for different income groups can give more in depth insights on the topic. Impact of environmental education, ethnicity and place of residence (Developed/developing country) can be considered as potential variables that might influence reuse and disposal behaviors. Studies can further explore the effect of social norms at micro (group) as well as macro (culture) level on reuse and disposal behaviours of the customers. Future research can further probe into the skills and resources that consumers exercise while strategizing their reuse

		<p>Voima, 2011) where they combine their own resources with the service providers resources to create value (Anker et al., 2015). While reusing the products consumers are generating a functional value for themselves independent of the service providers (Anker et al., 2015). Lower income groups, students, younger individuals and women tend to reuse clothes more than old population groups (Cruz-Cárdenas, Guadalupe-Lanas and Velín-Fárez, 2019). Impact of environmental education, ethnicity and place of residence (Developed/developing country) can also be explored in future studies as potential variables that might influence reuse and disposal behaviors behaviours among consumers. Altruistic people have lower propensity towards reusing old clothes, they instead preferred transferring their clothes to the ones in need (Türe, 2014). Future research can further probe into investigate the social norms, skills and resources that consumers exercise while strategizing their reuse behaviour. This can provide an opportunity to the brands to connect their customers to the channels to the recipients thus encouraging sustainable disposal of their products. Indulging in such behaviours creates ethical psychological value for the consumers (Türe, 2014).</p>		<p>behaviour.</p>
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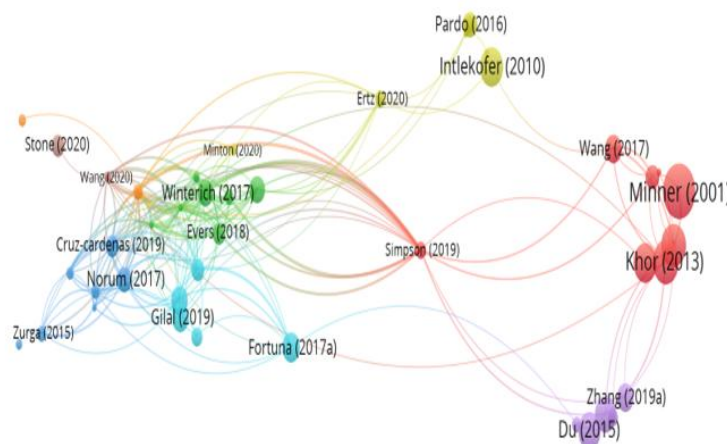
Reverse logistics (Cluster - 5)	Khor Kuan Siew, Udin, Zulkifli Mohamed	focuses on reverse logistics in green supply chain management practices. With the advent of technology, electronic equipment obsolescence rate has increased over time which has led to exponential accretion in the electronic waste which contains hazardous as well as valuable substances (Khor et al., 2016). According to the Global E-waste Monitor report 2020 53.6 million metric tonnes of electronic waste was generated in the year 2019 which is up by 21% in the past 5 years.	Green supply chain management practices Importance of product designing for the environment and product repair and disposal initiatives. Relationship between reverse logistics product disposition options, green product design (design for disassembly, design for environment, design for recycling) and resource commitment. Relationship between reverse logistics product disposition, institutional pressure and business performance.	The study can be replicated in other manufacturing related industries and the results obtained can be compared in order to get better insights into product disposition options available with the manufacturing firms. Effects of factors like customer co-operation, environmental awareness, green purchasing, perceived environment pressure, liberalization return policy, reverse logistic program formalization, technical and financial capability management support organizational learning etc. on reverse logistics implementation can be further studied. Effects of implementation of reverse logistics on psychometric variables like brand image, brand equity etc can be further investigated. Longitudinal study can be in order to understand the impact of green product designing in expediting the development of reverse logistic practices.
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### 5.2 Themes emerging from Bibliographic coupling

Bibliographic coupling happens when two articles cite the same third article. This procedure assumes that if two papers cite the same third paper, both papers are related and will be on the same or similar topics. The study extracted eight clusters (Figure 3) from the bibliometric analysis of documents. The authors could not identify common threads within the cluster in two clusters among

eight clusters. So, the present study considered only the following six clusters *Reuse and Reverse logistics, Redistribution attitude, Fashion industry & waste disposal, Fashion industry & waste disposal, Energy Sustainability and Product Disposa, Energy Sustainability and Product Disposal and Sustainable manufacturing.*

**Figure 3: Bibliographic Coupling of Documents**



### 5.3 Themes emerging from co-occurrence of words

The co- occurrence of keyword analysis facilitated in highlighting the most prominent research themes in the literature on disposal behaviour research. The co-

occurrence analysis performed on all 622 keywords using the criterion of a minimum of 3 occurrences of a keyword. Five clusters are formed from the co-occurrence of keywords analysis as Sustainable production and consumption behavioral patterns, Disposal practices,

Green product design and redistribution strategies, Value creation in consumer disposition behavior, and Factors influencing product disposition behavior

**Table A2: Themes emerging from Bibliographic coupling**

Cluster name & Cluster number	Focus
Reuse and Reverse logistics (Cluster -1)	<p>The cluster consists of eight research articles. A green product design helps in product repairing, reconditioning, and recycling. Khor et al., (2016) focuses on how institutional pressures such as regulatory and ownership pressure impact disposition activity. To mitigate the side effects of disposable items, it is always better to use or recover products in different ways and in different phases of the product life cycle (Kumar et al., 2007). There are some challenges in maintaining safety stocks and internal &amp; external product reuse and return policies (Minner, 2001). Product recovery can make in two cost advantageous ways: remanufacturing and refurbishing. According to Chen and Chen, (2019), concepts of refurbishing are mainly unregulated and widespread in some countries. Different processes are available in product disposition (Etse and Boateng, 2019; Khor et al., 2016) and environmental product design (Khor and Udin, 2013) and those are the prime task of any responsible organization.</p>
Redistribution attitude (Cluster -2)	<p>The cluster describes consumers' attitudes toward redistribution policies. Disposition or redistribution is tough of a product if it serves as identity in society as disposition or redistribution of car (Sandes et al., 2019). Sometimes consumers take photos before donating or redistributing their sentimental products (Winterich, Reczek and Irwin, 2017). The redistribution decision depends on the type of products and the environmentalist attitude of consumers, besides some other significant factors (Hou and Sarigöllü, (2021). Evers et al., (2018) suggested in their study how consumers' frugality and materialism impact on the consumers' behaviors. Besides that, organizations need to make some strategic decisions to maximize the aesthetic and emotional values of upcycled products to accelerate the redistribution attitude among consumers (Yu and Lee, 2019).</p>
Fashion industry & waste disposal (Cluster -3)	<p>The cluster discusses the disposal of clothes and fashion dresses from the industry and consumers. Cruz-Cardenas, J; and Guadalupe-Lanas, J have significant contributions to this topic. The life cycle of fashion dresses is now several weeks only. Disposition of clothes can be from both ends: customers' ends and as well as from industry ends. A lack of supply chain coordination from the industry (Tanaka et al., 2019), end consumers' choices, and several factors, including social cognition (Hwang, Jo and Oh, 2020; Cruz-Cárdenas, Arévalo-Chávez and Guadalupe, 2018), impact on cloths disposition behaviour. Contradictory studies are available on the disposable behaviour of young consumers (Cruz-Cárdenas, Guadalupe-Lanas and Velín-Fárez, 2019). Economic factors can affect the behaviour of consumers to keep or discard their dress or not; in some instances, less knowledge of environmental issues insists consumers dispose of their unused apparel unethically (Hwang, Jo and Oh, 2020).</p>

<p>Energy Sustainability and Product Disposal (Cluster -4)</p>	<p>It talks about energy sustainability and product disposal According to Hicks (2018), smartphones have an environmental impact compared to television and computers due to their energy consumption within their short life span. Religious values, emotions, and identity influence a person to dispose of their luxury items or not (Minton and Geiger-Oneto, 2020). Some brands sometimes run their disposal program for their luxury items, but many people dispose of their products randomly. Many advocates suggest leasing is better than selling (Intlekofer, Bras and Ferguson, 2010) because, at the end of the life span of products, consumers need to return their products to companies for remanufacturing purposes. The return process will speed up if there are few incentives for consumers. Remanufacturing is considered one of the energy-saving activities compared to product disposition (Intlekofer, Bras and Ferguson, 2010). So, organizations need to run their disposal program and awareness among consumers regarding the environmental incentives and energy sustainably for the next generation through their disposing behaviours.</p>
<p>Sustainable manufacturing (Cluster -5)</p>	<p>The previous cluster (theme 4) is concerned with energy sustainability, but the cluster didn't give the idea of sustainable manufacturing processes. In this cluster, researchers discuss the steps manufacturing sectors need to take for their sustainable manufacturing process. Products' energy consumption will increase if they use more carbon elements in their manufacturing process (Du et al., 2015). The study (Du et al., 2015) suggested a low-carbon manufacturing process for machine tool organizations. To produce sustainable products and maintain cleaner production processes, global manufacturers need to follow 3R processes (Remanufacturing/ Reuse/ Recycle) (Nagalingam, Kuik and Amer, 2013) with six sigma methodology to keep recovery costs and manufacturing lead time efficiently and disposition amounts.</p> <p>At the time of product design, organizations need to consider reuse and recycling costs at the end of the life cycles of products (Zhao and Thurston, 2013). An organization focused on environmental sustainability involves remanufacturing post-consumer goods (Zhang et al., 2019), and they consider it an extended responsibility (Nidhi and Madhusudanan Pillai, 2019).</p>
<p>Second-hand product &amp; E-waste disposal (Cluster -6)</p>	<p>Proper solid waste management reduces greenhouse gas emissions and negative environmental impacts. An attitude toward using second-hand products promotes waste management policies and depends on the types of products and channels of acquisitions and disposal of that product. The fashion sensitivity of today's generation reduces the lifetime of clothes (Ekström and Salomonson, 2014), increasing a considerable amount of wastage within the overall solid wastage. Liang and Xu (2018) suggest age and culture impact the reusing of second-hand products, and the routes of second-hand product distribution depend on the types of products and the targeted consumers (Fortuna and Diyamandoglu, 2017a).</p> <p>The electromagnetic radiation from electronic products can increase health-related issues. (Borthakur and Govind, 2019). Due to some emotional attachments or lower disposal costs, people are unwilling to dispose of their electronic products. Electronic product manufacturers must educate consumers on how to resell and dispose of electronic products (Borthakur and Govind, 2019). The problems of e-waste disposal are most prominent in developing countries (Fortuna and Diyamandoglu, 2017b; Borthakur and Govind, 2019). Most interestingly, positive word of mouth (WOM) significantly impacts end consumers' motivation levels on their E-waste disposal behaviour (Fortuna and Diyamandoglu, 2017b).</p>

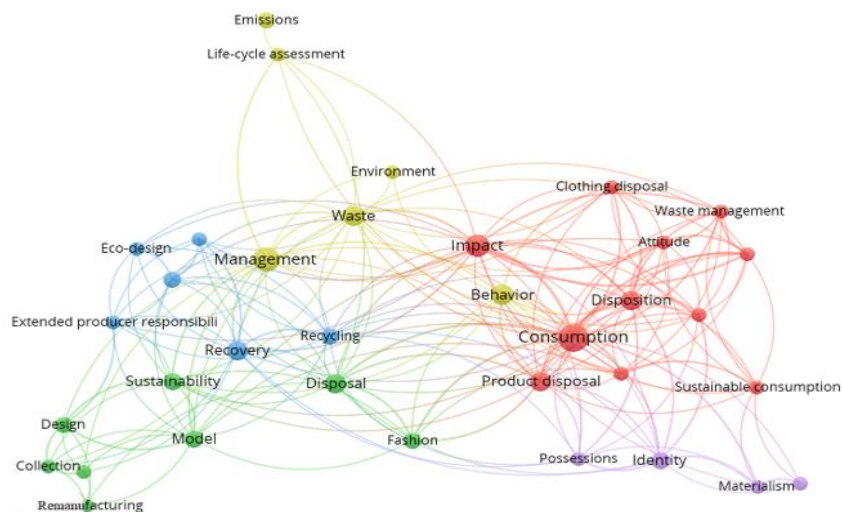
**Table A3: Keyword co-occurrence and Themes generations**

Cluster Name & Cluster Number	Focus	Keywords	Most cited articles	Cumulative weight of total link strength	Average weighted total link strength
Sustainable production and consumption behavioral patterns (Cluster -1)	Focused on the consumption intentions and the influence of consumers' perceived values, perceived concerns and descriptive norms on their purchase intentions that would will , in turn, fuel consumers' integrated motivation for e-waste and subsequent e-waste disposal behaviours (Liang and Xu, 2018; Gilal et al., 2019).	attitude, circular economy, clothing disposal, clothing disposal behavior, consumption decisions, disposition impact, product disposal, sustainable consumption, waste management	Conesa et al.(2005) Gilal et al.(2019) Liang, J. et al.(2018) Yu, S. et al.(2019) Norum, P. S. (2017)	241	21.91
Disposal practices (Cluster -2)	Focused on how to optimize an integrated solid waste management system that includes reuse strategies and practices to minimize greenhouse gas emissions, having economic benefits that adds value (Van Der Laan, Dekker and Salomon, 1996; Fortuna and Diyamandoglu, 2017b; Šimat et al., 2020).	collection, design, disposal, fashion, model, remanufacturing , strategies, sustainability	Šimat, V. et al. (2020) Fortuna, et al.. (2017) Van der Laan et al. (1996)	98	12.25

<p>Green product design and redistribution strategies (Cluster -3)</p>	<p>Focused on the safety stock planning in green supply chain strategies such as reverse logistics, green product design, recycling, reuse, and remanufacture before discarding the products, which could lead company's commitment toward environmental sustainability (Sodhi, Young and Knight, 1999; Minner, 2001; Donnelly et al., 2006; Khor and Udin, 2013; Zhang et al., 2019). The articles looked at the performance outcomes achieved through the employment of reverse logistics product disposition alternatives, as well as the interplay between institutional forces and these relationships (Khor et al., 2016; Fortuna and Diyamandoglu, 2017b).</p>	<p>eco-design, extended producer responsibility, recovery, recycling, reverse logistics, supply chain management</p>	<p>Khor, K. et al.(2013, 2015) Fortuna et al. (2017) Donnelly, K. et al.(2006) Zhang et al.(2019) Minner, S. (2001) Sodhi et al.(1999)</p>	<p>68</p>	<p>11.33</p>
<p>Value creation in consumer disposition behavior (Cluster -4)</p>	<p>Focussed mainly on the value created by reusing clothes that would lead to a valuable approach to curb product disposition (Cruz-Cárdenas and del Val Núñez, 2016). Consumer and recovery processor views of a used product play an</p>	<p>behavior, emissions, environment, life-cycle assessment, management waste</p>	<p>Cruz-Cárdenas et al. (2019) Du, Y. et al.(2015) Dunnigan L. et al. (2018) Ertz et al.(2020) Kumar, V. et al.(2007)</p>	<p>62</p>	<p>10.33</p>

	essential role in the product life cycle contributing to sustainability (Kumar et al., 2007; Ertz and Patrick, 2020).				
Factors influencing product disposition behavior (Cluster -5)	Focused on different predictors for consumer spending in clothing and footwear, like, as the use of alternative methods for obtaining clothing and henceforth, value creation by reusing clothes (Cruz-Cárdenas and Arévalo-Chávez, 2018; Cruz-Cárdenas, Guadalupe-Lanas and Velín-Fárez, 2019).	identity, materialism, motivation, possessions	Cruz-Cárdenas et al. (2018, 2019)	33	8.25

**Figure 4: Co-occurrences of Keywords**



**Nomological Network**

Each cluster comprised the most frequently occurring keywords (Annexure, Table A3 and Figure 4), implying that the phrases/words appeared together the most often.

The nomological diagram (Figure 5) discusses the antecedents, mediators, moderators and consequences of disposition behavior which incorporates existing concepts with a more robust theoretical framework.

Antecedents of disposal behavior are extracted from the reviewed papers and classified into four factors: value drivers, social & behavioural drivers, motivational drivers and cognitive drivers. The main drivers that help to minimize waste are functional, emotional and social value (Hou and Sarigöllü, 2021). Many other antecedents are self-expressive value, hedonic value, economic value and environmental value (Yu and Lee, 2019), social and behavioral drivers such as word of mouth that can be either negative or positive (Gilal *et al.*, 2019) and philanthropic awareness (Hwang, Jo and Oh, 2020). Another set of antecedents labeled motivational drivers, such as nostalgia (Wang *et al.*, 2020), religiosity (Minton and Geiger-Oneto, 2020), priming shame (guilt) (Minton and Geiger-Oneto, 2020), attachment (Simpson *et al.*, 2019), frequent use (Simpson *et al.*, 2019), perceived concerns (Liang and Xu, 2018), perceived descriptive norms (Liang 2016), resource commitment (Khor 2016) and self-image congruence (Sarigöllü, Hou and Ertz, 2021), cognitive drivers such as consumer's attitude (Sarigöllü 2020), product quality (Sarigöllü, Hou and Ertz, 2021), product price (Sarigöllü, Hou and Ertz, 2021), and uniqueness (Liang and Xu, 2018).

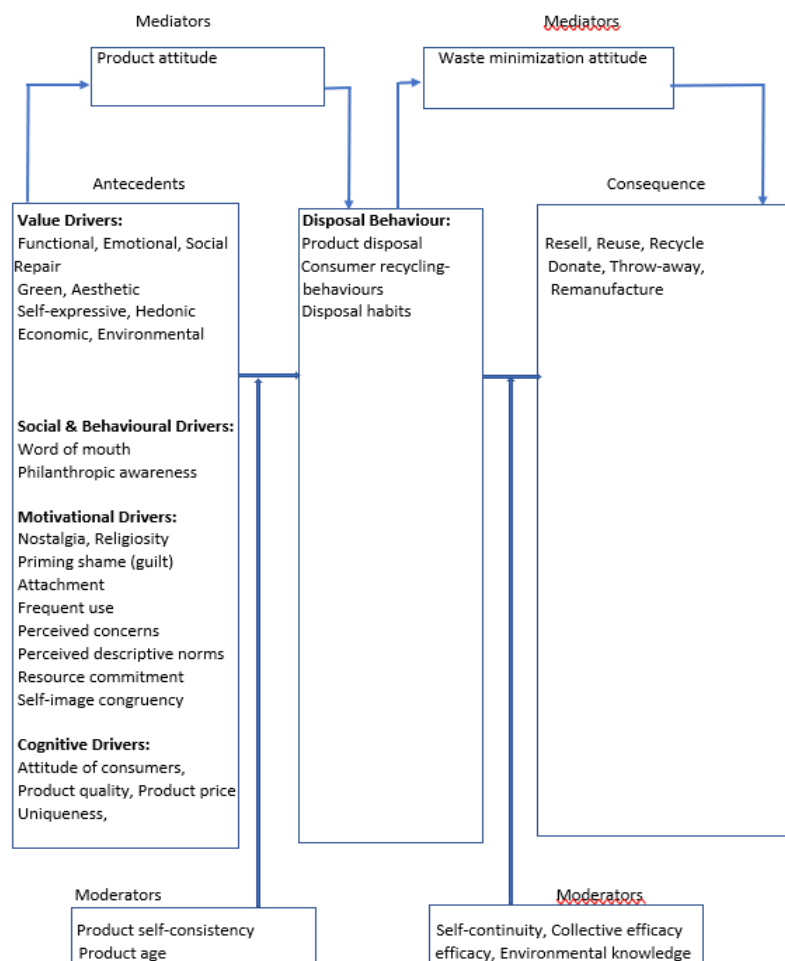
Mediators mediate the associations between disposal behaviour and its antecedents or between disposal behaviour and related consequence(s). Waste minimization attitude (Hou and Sarigöllü, 2021) that

mediated relationships among disposal behaviour and associated consequences before products or materials are labelled as waste or recognised as waste having adverse effects. Product attitude is a further mediator between antecedents and disposal behaviour. Researchers studying green product fields continue to use the product attitude approach in their efforts to understand consumer behaviour for eco-friendly products, particularly in items with ethical or environmental elements (Yu and Lee, 2019).

The moderators from this study were found out as self-continuity (Wang *et al.*, 2020), collective efficacy (Wang *et al.* 2020) and environmental knowledge (Hwang, Jo and Oh, 2020) that shows the moderating effect between disposal behaviour and its consequences. The study suggests that product self-consistency (Hou and Sarigöllü, 2021) and product age (Simpson *et al.*, 2019) moderates the associations between disposal behaviour and its antecedents.

The main consequences that have been further summarized from the review papers are as follows: resell, reuse, recycle, repair, donate, throw away, reconditioned and remanufactured (Khor *et al.*, 2016; Simpson *et al.*, 2019; Minton and Geiger-Oneto, 2020; Wang *et al.*, 2020; Sarigöllü, Hou and Ertz, 2021), which will help in issues like environmental protection and making towards a more sustainable environment.

**Figure 5: Variable diagrams of Disposal behaviours**



### Conclusions, and limitations:

The impact of waste management on ecological degradation is a significant concern for people, and proper disposal behaviour can be a remedy for this concern. The novel side of disposal behaviour is that it is essential for all kinds of companies, irrespective of the size of companies. The study explores how disposal behaviour literature has grown in the last thirty years, but extensive research has been done after 2011. So, the research topic has flourished within the last ten years, and it is an emerging research field for future researchers. The study performs bibliometric analysis followed by qualitative analysis of research articles. Collaborative research has increased a lot in the last five years (Table 3). Many significant and different journal articles published on this topic. In this study, themes generated from co-occurrence of words, co-authorship, and bibliographic coupling, helps to understand the present and past research trends. The study finds six themes from bibliographic coupling, and those themes are: Reuse and Reverse logistics, Redistribution attitude, Fashion industry & waste disposal, Energy Sustainability & Product disposal, Sustainable manufacturing, and Second-hand product & E-waste disposal. Nomological diagram of the study justifies that the value systems of consumers and producers insist on choosing the options of different disposal behaviour techniques. Besides the value system, other criteria like product attributes, waste minimization attitude, and impact of environmental knowledge on disposal behaviour and consequences. Researchers from North America, especially from the USA, Canada, and Spain, have made significant contributions to this field. All the three countries mentioned above follow stringent rules and regulations on waste disposal, as the USA follows the law 'Resource Conservation and Recovery Act (RCRA)'. The city university of New York, University of British Columbia, Universidad Tecnológica Indoamérica, and McGill University are prominent institutions for researching disposal behaviour within the North American region. After reviewing the last thirty years' articles on disposal behaviour, the authors of this study suggest that to curb pollution levels, Govt. and responsible authorities need to take more action on disposal behaviours.

Despite insightful findings, this paper is not exempt from limitations. First of all, the data corpus of this study was extracted from the web of science (WOS) instead of other databases such as PubMed and Scopus. However, WOS is the most prominent and widely accepted database for scientific and bibliometric studies (Yang *et al.*, 2013). The study considers only articles in the English language and excludes non-peer reviewed journals, review articles, books, and articles written in different languages. Some valuable articles might be rejected for review due to search criteria. The second limitation is the quality of research articles. Bibliometric analysis is a quantitative process. Hence, research articles' quality and content may not be up to the expected standard (Dunk and Arbon, 2009).

### Future research directions:

Extensive literature reviews of eighty-eight research articles in this study provide in-depth knowledge on disposal behaviours to identify different themes and future research scopes. The paper has already suggested some of the research scopes broadly; it can be categorized into five promising areas: product redistribution, bi-product disposal strategies, acquisitions and disposal methods of used products, factors influencing product reuse strategies, and reverse logistics (Table 3). Besides the above research areas, minimal research has been done on 'green disposal' till now. So, future researchers can work on the policies of green disposal and implementation of that. As the field is not mature enough, future researchers of different sub-discipline can expand their work in this domain. Not much research has been done on validating analytical waste disposal models with empirical data. So, future research in this area could be fruitful for coming researchers. Most of the disposal behaviour models are in the context of big organizations. So, future researchers can work on the model of disposal behaviour for small to medium enterprises.

The authors would like to argue that brand ambassadors influenced the behavior of extant and potential customers. One needed to understand that there has been an increased emphasis on circular economy. The tenets of circular economy emphasized that a product's used components, after spanning the product life cycle, should again be reused for the production of new sets of products. Brand ambassadors could highlight this message that potential and existing customer would follow. Furthermore, this issue fostered adherence to the United Nations' (UN) Sustainable Development Goals (SDGs). Future researchers can try to find how the WOM of brand ambassadors on product disposal can impact the disposal behaviour of consumers.

A few countries have already introduced waste management regulation acts, but that still need to be fully operational. So, future researchers can work on the existing disposal behavior models and, may develop more robust, modified, effective, and operational models.

E-waste is one of the main concerns for today's world, and another related concern with e-waste is recycling the waste of electrical and electronic equipment (WEEE). A conflagration or blaze can be caused if batteries are in the WEEE. Very few projects are running to use AI to segregate e-waste before going to recycling. Future researchers can research with new technologies like AR, VR, and MR for recycling e-waste and to mitigate accidents...

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